

Analysis of Environmental Health Strategy Center Membership

Jillian Blouin '13 and Kaitlyn Bernard '13

ES212, Environmental Studies Program, Colby College

Methods

Analysis was performed in ArcGIS 9.3.1 using data from Maine Office of GIS and ESRI. EHSC provided data for each of their 2,431 members including: physical address, member identification number, and support activity information. Members were assigned a numeric rank (0-7) based on the number and relative value of actions taken in support of EHSC. Actions were taken by members either online or by phone and phone action was considered more valuable than online action (Figure 1).

Membership was mapped by creating an address locator to geocode individual members. Roadways were based on the ESRI911 roads geodatabase. This tool allowed each EHSC member to be placed on a specific location on the map. We could not match 350 member addresses so these were individually mapped using options generated by the tool. The aim was to place members in the correct legislative district and not their exact geographic location.

Density of members per square mile was computed by dividing the area of each legislative district by membership count per district by the using the field geometry calculator. Kernel density was computed based on points per square kilometer with a search radius of 10.85 kilometers. Statistics were extracted using zonal statistics, joined with districts layers and categorized using a quantile method to display the mean kernel density for each district. Data used was collected from January 2011 to March 2011.

Results

Figure 1 shows the location of EHSC members and their actions. Of 2,431 EHSC members only 39 had taken 3 or more actions in support of the EHSC. Membership is unequally distributed and concentrated in southern and central Maine (Figure 2). More members have taken online action (30%) than phone action (3.54%), but a majority of members had taken no action at all (65.69%).

The senate districts with the highest member counts are districts 8, 7, 6, 11, and 18 with ≥ 171 members (Figure 2). These districts were also districts with high member density (Table 1). District 18 is a key districts which has high membership count but lower density in comparison to other districts with high member counts (Figure 3).

The house districts with highest member counts are 129 and 144 with ≥ 76 members these districts are also swing districts of interest to the EHSC (Figure 4). The densities for these districts are low, 11th and 33rd out of 151 districts. The most dense house districts are in the area surrounding Portland in a clump with the exception of district 72 (Table 2). District 72 has a high density because it has an area of only 1 sq. mile and 4 members in that district. Key legislative house districts 18, 129, and 144 have high member count increasing respectively (Figure 4).

Figure 2 shows the density of members in terms of where the geocoded membership points. Highest density areas are shown in dark blue and are primarily in the area surrounding Portland and Bangor. 2,080 EHSC members live within 50 miles of one of the offices, and 1,520 members live within 30.

Introduction

The Environmental Health Strategy Center (EHSC) is a non-profit organization based in Maine that works to promote legislation protective of human health and the environment. Key legislative districts of importance to the EHSC are Senate district 18 and House districts 18, 129, and 144. The goal of this project was to create a series of maps using ArcGIS to analyze EHSC membership patterns across Maine Senate and House legislative districts. These maps will provide the EHSC with spatial analysis to identify where their support is the greatest. Analysis is based on data from January 2011 to March 2011.

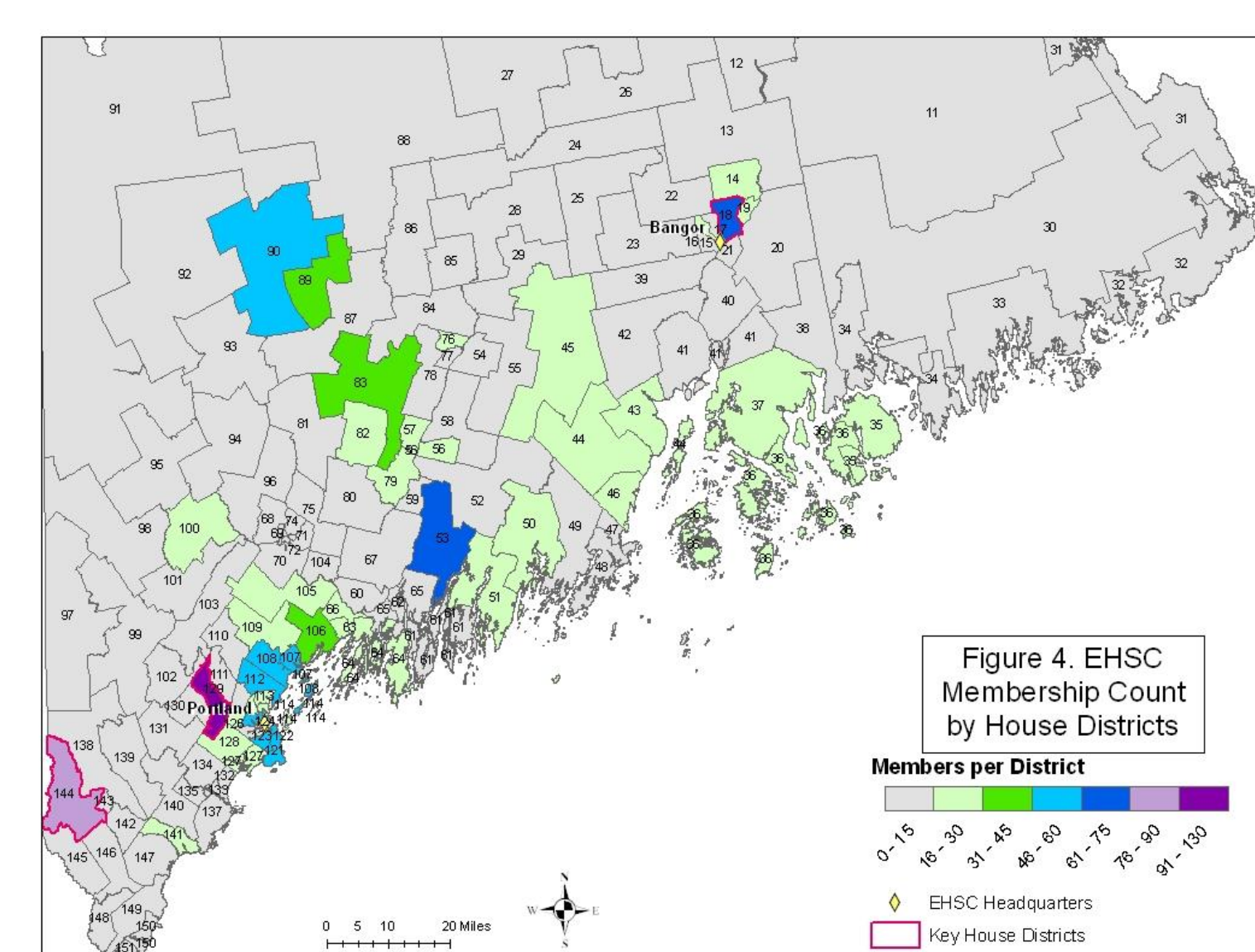
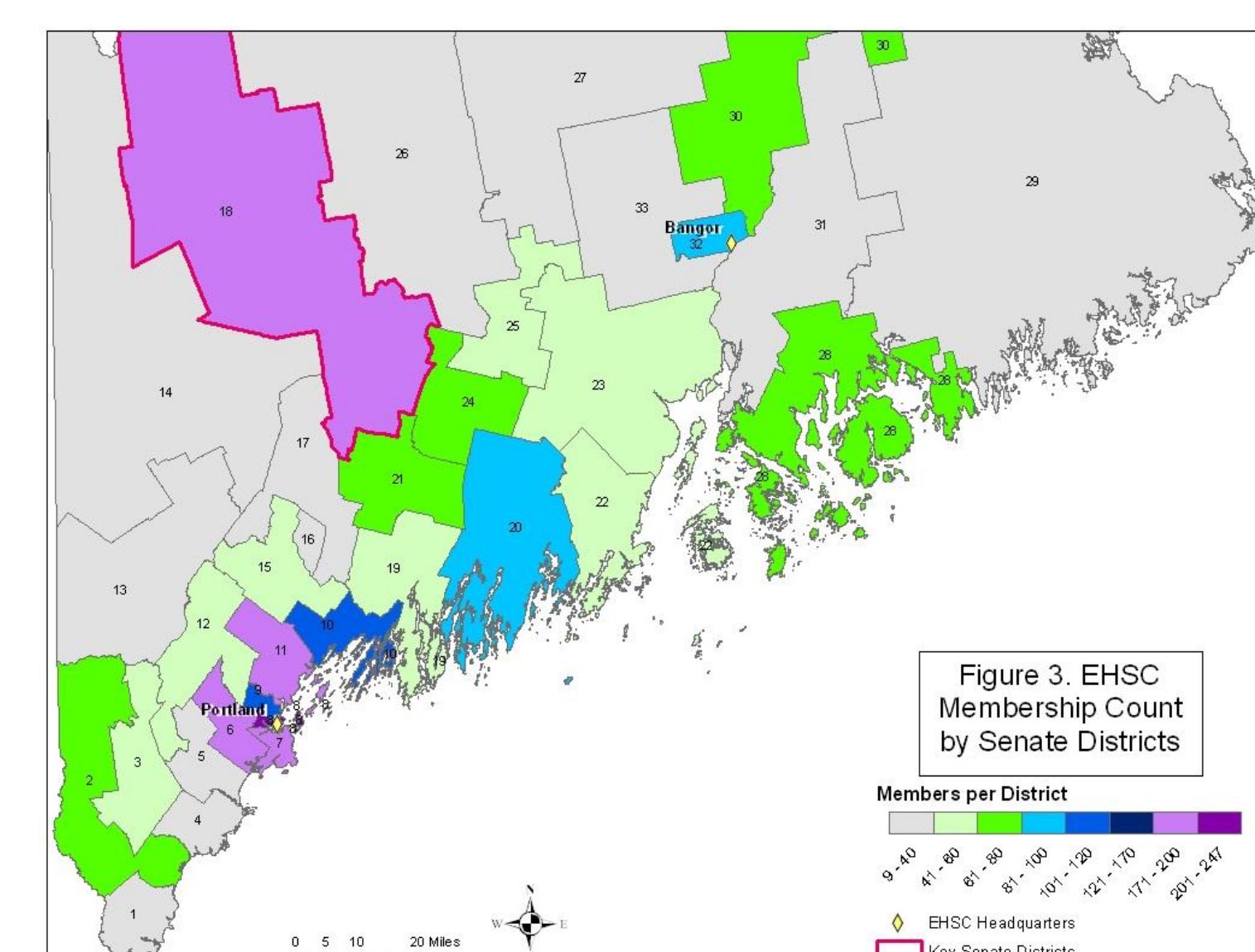
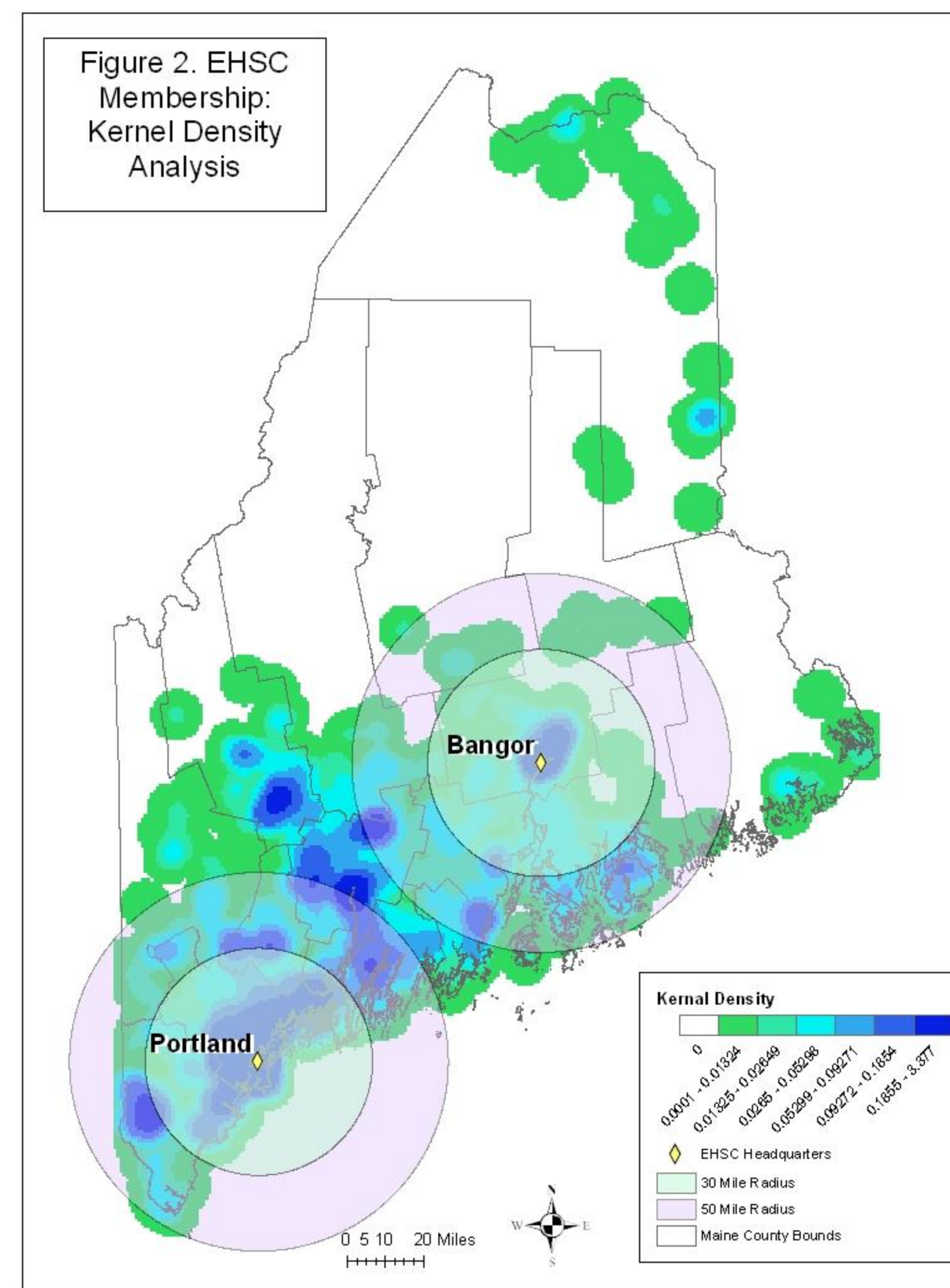
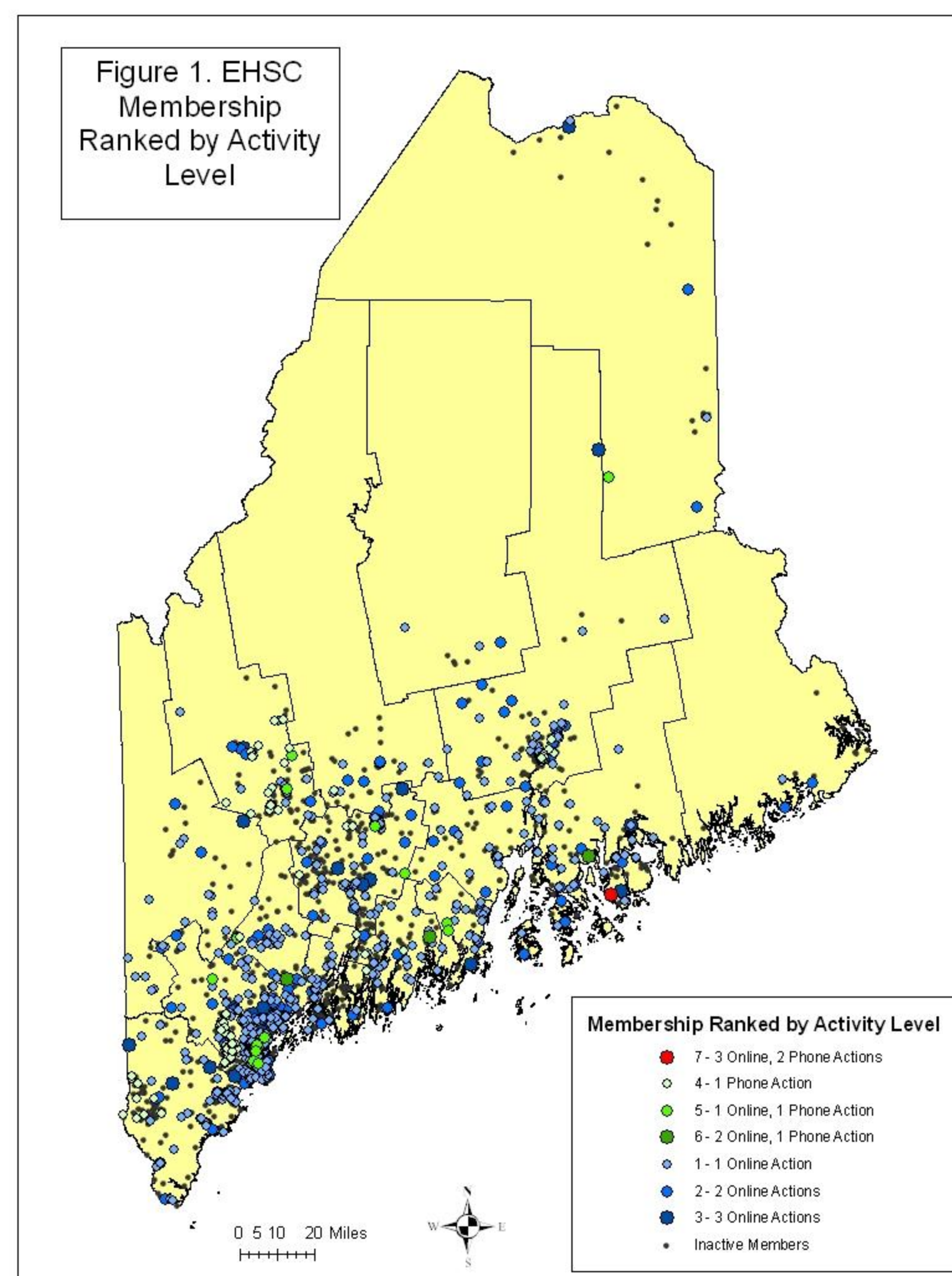


Table 1. Membership Density for Senate Districts

Rank	District #	Density (Member/sq. mile)
1	8	22.45
2	9	5.33
3	7	5.09
4	6	1.97
5	11	1.36
6	32	1.32
7	10	0.82
8	16	0.43
9	4	0.38
10	5	0.32

Table 2. Membership Density by House District

Rank	District #	Density (Member/sq. mile)
1	120	88.00
2	118	53.00
3	119	53.00
4	115	50.00
5	122	24.00
6	117	12.25
7	123	6.86
8	121	4.58
9	107	4.38
10	72	4.00

Discussion

As found in the results 86% of members live within 50 miles of one of the EHSC offices, and 63% live within 30 miles. High membership count and density is concentrated in central and southern Maine, which could be explained by fact that the EHSC has offices in Portland and Bangor and thus recruits support more effectively in these areas. These findings explained by the general population density of the state of Maine. Northern Maine is largely unpopulated, while most of the population lives in southern and central Maine.

The swing districts of interest are represented by legislators who are republicans on the Environmental and Natural Resources Committee. All of these districts have significantly high count membership but lower membership density in comparison to other high count districts. The size of the district has a large impact on the density calculation and is not as important when analyzing membership in the swing districts.

The high rate of recorded member inactivity is because the EHSC has only been recording activity data for a few months. Active members may be inaccurately represented in the data set. All data is merely a snapshot of EHSC membership data, and will need to be updated to remain a relevant tool.

Conclusions

1. Member count and density are highest in southern and central Maine due to the location of the EHSC offices and scope of influence.
2. High membership count is more representative of the potential impact of member activity on legislation than density, which is skewed by area.

Acknowledgements

Thank you to Will Childs and Rachelle Curran from the EHSC for providing data. We would also like to thank Greg Merritt '12 for helping us analyze and organize our data in Microsoft Excel. Finally, we must thank Professor Nyhus and Manny Gimond for helping us carry out the appropriate GIS functions and tools.

References

EHSC. Environmental Health Strategy Center, 2011. Web. 06 Apr. 2011. <<http://www.preventharm.org>>.